From:	Bucholtz, Paul (DEQ)
To:	Fortenberry, Chase; Bondy, Garret E
Cc:	"Griffith, Garry T."; Jeff.Keiser@CH2M.com; Saric, James; Carlson, Janet; Wood, Nicole; Synk, Polly (AG); King, Todd W. (KingTW@cdmsmith.com); Devantier, Daria W. (DEQ)
Subject:	RE: Disapproval of Kalamazoo Area 2 Supplemental Remedial Investigation Report
Date:	Friday, April 12, 2013 10:00:32 AM
Attachments:	MDEQ_Area2_20130412.pdf

Chase and Garret,

Enclosed is an electronic copy of MDEQs comment letter of the Area 2 SRI Report. A hard copy will follow in the mail.

From: Saric, James [mailto:saric.james@epa.gov]
Sent: Monday, April 08, 2013 3:19 PM
To: Fortenberry, Chase
Cc: 'Griffith, Garry T.'; Bucholtz, Paul (DEQ); Jeff.Keiser@CH2M.com; Bondy, Garret E; Carlson, Janet; Wood, Nicole
Subject: Disapproval of Kalamazoo Area 2 Supplemental Remedial Investigation Report

Chase,

Enclosed is an electronic copy of U.S. EPA's disapproval of the Area 2 Supplemental Remedial Investigation Report and associated comments.

Thanks
Jim Saric
(312) 886-0992

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

RICK SNYDER
GOVERNOR

DAN WYANT
DIRECTOR

April 12, 2013

Garret E. Bondy, P.E.
AMEC Environment & Infrastructure
46850 Magellan Drive, Suite 190
Novi, Michigan 48377

Dear Mr. Bondy:

SUBJECT: Michigan Department of Environmental Quality Comments for Draft Area 2 Supplemental Remedial Investigation Report, Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site

The Michigan Department of Environmental Quality (MDEQ) has prepared these comments based on our review of the “Area 2 Supplemental Remedial Investigation Report” for the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (SRI Report). These comments reflect the MDEQ’s concerns with the subject document and approach taken by the potentially responsible parties (PRPs) to fulfill their obligations as set forth in the United States Environmental Protection Agency (USEPA) Administrative Order on Consent (AOC). Based upon a review of the document, the MDEQ has recommended disapproval to the USEPA pursuant to Section X, 39, (d) of the AOC.

On June 27, 2012, the USEPA approved the SRI Report submitted on behalf of Georgia-Pacific for the defined Area 1 of the Kalamazoo River Superfund Site. The work on an approvable Feasibility Study (FS) for Area 1 is still underway. Prior to USEPA’s approval of the Area 1 SRI Report, there were iterative rounds of review and comment by the agencies. In the final analysis, significant MDEQ comments were never addressed in the Area 1 SRI Report. Overall, it is apparent that the Area 2 SRI Report continues the pattern of not fully representing the range of risks at the site or attempts to obscure these risks. The MDEQ will continue furthering key concerns where appropriate throughout the Area 2 SRI Report development process and as they relate to the FS and Proposed Planning stages of the remedy selection process, and looks forward to future collaborative efforts in an improved document development process.

The following comments represent the key issues that the MDEQ has identified for discussion with the PRPs and USEPA.

1) Contrary to assertions, polychlorinated biphenyl (PCB) levels still pose unacceptable risks to fish-consuming populations and piscivorous ecological receptors. The SRI must clearly state that the FS shall evaluate remedial options that will reduce risks to acceptable levels. A range of sediment Remedial Action Limits, resultant risk-based surface weighted average concentration (SWAC), and projected whole body and filet

fish tissue concentrations/risks will need to be fully evaluated in the Area 2 Alternatives Summary Technical Memorandum and FS as requested by the USEPA and MDEQ for Area 1.

2) The document inappropriately speculates about the degree of fishing in Area 2 as was done for Area 1. It is well documented that people do actively consume fish from the Kalamazoo River over its entire length, and piscivorous ecological receptors are known to occur in the area. The remedies must appropriately lower risks to fish consumers, beyond fish advisories which are not sufficiently protective.

3) The impact of dam removal, which will dramatically change river conditions and potentially distribution of PCBs, has not been adequately discussed. There is little mention of dam removal within the SRI as it pertains to conditions following a dam removal scenario at the Otsego City Dam. Most of the velocity/shear figures reviewed appear to only consider the dam-in scenario. The report should discuss the dam-out scenario, with discussion on channel morphology (slope/pattern/profile), velocities/shear stress, PCB redistribution, channel relocation, etc.

4) The new method for calculating SWACs in Area 2 is even more problematic than the methods used for Area 1. The calculation of Area 2 sediment SWACs using the geometric mean as opposed to the arithmetic mean results in an underestimate of average sediment concentrations up to 30-fold. The USEPA states that, "Because of the uncertainty associated with estimating the true average concentration at a site, the 95 percent upper confidence limit (UCL) of the arithmetic mean should be used…."

5) The document fails to adequately discuss the potential impacts from long-term contributions of PCBs to the instream environment from PCBs currently located in braided channels, banks, and floodplains. The conceptual site model and fate and transport sections of the report need to recognize the interaction between the floodplain, banks, and aquatic system.

6) The document needs to provide additional discussion on fish lipid, laboratory analysis, uncertainty (confidence limits), and the impact on the fish trend analysis, both historically and for future projections in the FS.

7) Ceresco Reservoir and Morrow Lake should both be used as reference areas in discussions regarding background in consideration of goals for fish tissue levels.

8) Temporal trends in fish, water, and sediment do not account for lipid, flow, season, and organic carbon. This results in inaccuracies for estimated trends.

The comments discussed above cover the key issues identified by the MDEQ review team and are not meant to be an exhaustive review of the entire SRI Report. Enclosed are more detailed general and specific comments. The MDEQ appreciates the opportunity to have reviewed and commented on the draft SRI Report. If there are any questions in regard to the MDEQ's comments related to the review of the document, please contact me at the number below. The MDEQ looks forward to continued progress for Area 2.

Sincerely,

Paul Bucholtz
Project Manager
Site Assessment and Site Management Unit
Superfund Section
Remediation and Redevelopment Division
517-373-8174

Enclosure
cc/enc: Mr. L. Chase Fortenberry, Georgia-Pacific
Mr. Todd King, CDM Smith
Ms. Rebecca Frey, USEPA
Mr. James Saric, USEPA
Mr. Samuel Borries, USEPA
Mr. Michael Berkoff, USEPA
Mr. David Kline, MDEQ
Ms. Daria W. Devantier, MDEQ
Mr. Eric Alexander, MDEQ
Mr. John Bradley, MDEQ

Area 2 SRI

MDEQ Comments

General Comments

1) The methods used to estimate volume of contaminated sediment and soil exclude low concentration material overlying contaminated sediments. Generally RI volume estimates should include all material that would need to be removed if an active remedy were selected. The RI methods should be modified to include this "overburden" material in order to accurately support cost estimates.

2) The Area 2 SRI demonstrates that elevated levels of PCBs are present in sediments and floodplain soils in the upper and southern braided areas as well as the dead end channel (Subarea E on Figure ES-3). As noted in the Area 2 SRI, of the 16 samples with concentrations above 50 milligrams per kilogram or parts per million (ppm), 12 were collected in the upstream braided portion of Area 2, and 14 of the samples are from the subsurface. Although the highest concentrations of PCBs are present in subsurface sediment and soils, high flow events have the potential to erode sediments and bank material as new river channels are formed. Although the erosion pins showed minimal changes in bank profile and the modeling effort shows that shear forces are generally low in off channel areas, changes in channel configuration are expected to take place only during high energy, episodic events. The erosion pins did not measure these type of events. Similarly, the modeling effort did not account for changes in channel configuration. Erosion associated with new channel formation has the potential to re-release significant quantities of PCBs into the environment. The process of new channel formation and the potential for the re-release of PCBs from subsurface soil and sediment should be incorporated into the conceptual site model.

3) Data collected within Area 2 suggests that sediments and floodplain soils are generally well characterized – especially in comparison to Area 1. The Executive Summary Key Findings should state that data demonstrate that PCB contamination present in floodplain soils, sediments, surface water and biological tissue present unacceptable risks to human health and the environment. Further, as described in the above comment, elevated levels of PCBs in subsurface sediments have the potential to be mobilized and contaminate downstream areas, be exposed, and become more bioavailable.

4) The SRI should include a discussion indicating that the mass and volume of PCB contaminated materials may be significantly underrepresented at locations where Macro-Cores were used to collect floodplain and bank samples. The sampling methodology changed during collection activities to improve retrieval of fine grained soils and to obtain soil at deeper depths. Field personnel recognized that more fine grain deposits were consistently obtained using three-inch Lexan tubes in comparison to those obtained using the Macro-Core. In addition, the Lexan tube could be used to go deeper than four feet without returning the core to a previous hole. It is suspected that smaller inner diameter of the Macro-Core resulted in either compression or displacement of softer, fine grained material, reducing retrieval and biasing the results of the core towards coarser material. Secondly, the pre-determined core depth from the work plan repeatedly

proved insufficient for retrieving fine grain deposits at greater depths thought to contain PCB materials. The degree to which the fine grain deposits are underrepresented in the data set is unknown. A methodology needs to be developed that utilizes available information (e.g., geomorphic information, adjacent cores, field recon, aerial photo review, etc.) to understand and estimate the nature and extent of PCB contaminated soils at Macro-Core locations. A correction factor may need to be applied to correct the data from Macro-Core locations.

5) The SRI needs to discuss implications of floodplain sampling methods by a) depict locations that utilized the Macro-Core or Lexan tubes; b) discussion on differences between methods; c) discussion on results of resampling Macro-Core locations with Lexan tubes; and, d) how to correctly interpret and evaluate PCBs and stratigraphy results from each method to understand nature and extent of PCBs in the floodplain. A location map of sample collection method is presented in Attachment A Figure. The two bullets below present discrepancies between the methods that support the need for further evaluation in the SRI document.

   a) Presented in Attachment A Table is a summary of the floodplain cores collected within Area 2 in 2011 and 2012 (no previous RI or EPA cores). PCB data are grouped by MDEQ's geomorph ID and collection method. Sample count, core penetration, and core recoveries are also presented. For those locations collected using a hand auger, in conjunction with a Macro-Core, it may appear that penetration and recovery depths are deeper and/or similar to Lexan, however, the Macro-Core compressed and/or pushed material away so the data are not as useful. One example where Macro-Core and Lexan data intrepreations are different is at LT-6 and PMC-2 (island east of Gun River and north of 'knife blade'). are yellow and relate to clay island). The table shows how the Macro-Core locations on this island significantly underestimate PCB mass and volume.
   b) The table below presents 4 locations that were resampled and represent co-located samples. Three of the four had significant increase in the maximum PCB (and one was slightly less), along with greater penetration and recovery depths. Again, the implication of this deficiency in collection methods is underestimating PCB mass and volume, and potentially impacting where FS alternatives are targeted.

Original (Macro-Core)	Max PCB (ppm)	Pen / Rec (feet)	Resample (Lexan)	Max PCB (ppm)	Pen / Rec (feet)
OCIFP-046	11	4/2.3	OCIFP-138	61	6.2/5.6
OCIFP-065	1.3	4/1.6	OCIFP-139	1.1	4.4/3.9
OCIFP-086	0.19	4/1.8	OCIFP-143	35	6.8/5.9
OCIFP-099	0.4	4/2.3	OCIFP-141	23	6.3/5.7

6) The Area 2 SWAC is presented as 0.31 ppm. Certain subareas of Area 2 have significantly higher SWACs. For example, the SWAC for the cut-off braids is 2.9 ppm while the SWAC for the lower braids is 0.45 ppm. These two areas also contain the majority of the PCB mass within Area 2 as presented in Table 5.2-14. The SRI needs to more clearly document how sediment SWACs, mass, and sediment volumes are calculated to permit evaluation.

7) The risk evaluations are focused on risks compared to SWACs. A complete evaluation of risks from PCB contaminated materials at depth needs to be made with respect to areal extent, depths, mass, volume and risk to human health and the environment, especially due to the potential for re-exposure in a dynamic river system.

8) OU-Wide SWAC—there are inappropriate uses of means, medians and geometric means.

   a. Methods for calculating SWACs inappropriately combine estimates of the mean, median and geometric mean.

   b. The approach is based on stratification of the site into sub-areas that may be a good idea, however the estimation method is inappropriate.

   c. Concentrations selected to represent subareas are up to a factor of 30 lower than the arithmetic average PCB concentration which would be more appropriate

   d. Uncertainty bounds for the SWAC should be included in the analysis. Exposure assessments are based on upper confidence limits and as SWAC is used as a metric of exposure the upper confidence interval is needed.

   e. Data reported in tables for SWAC are inconsistent with differing sample counts.

   f. SWAC values are inconsistent with values used to calculate mass in the top two-inches of sediment where the arithmetic average was used consistently.

   g. A more appropriate approach was used at the Duwamish River and is described in detail in Appendix H of the Feasibility study. This method employs a bootstrap procedure designed for non-normally distributed data arising from a stratified random sampling design.

9) Individual subarea SWAC estimates are inappropriate for comparison to risk based thresholds.

   a. Methods used to calculate SWACs fail to include upper confidence limits which are the appropriate metric for exposure assessment in risk based evaluations. Upper confidence limits should be included in the RI for all estimates intended to be used for comparison with risk based thresholds, or for estimating hazard quotients.

   b. Individual subareas generally have relatively low sample sizes which do not lend themselves to accurate development of spatial weights for SWAC calculation.

   c. These areas should be characterized using standard statistical guidance developed for estimating exposure point concentrations (EPCs) for risk characterization. This involves selection of appropriate statistical methods that properly account for lower sample sizes with non-normally distributed data, such as the Chebychev method for estimating the UCL.

10) Methods for estimating uncertainty in volume and mass of PCB contaminated sediments were developed as part of the revised engineering performance standards. The performance standards were developed in response to the Hudson River Peer Review. These methods, with small modifications, should be used to develop uncertainty bounds for volume and mass estimates in Area 2. The methods are summarized below and are available in full from the USEPA (2010).

11) Temporal Trends in Water PCB Concentrations (Section 5.4)

a. This section shows that PCB concentrations vary seasonally and with flow, indicating that apparent differences in concentration may be due the nature of sampling across these factors. A more careful analysis should be conducted to show that these potential biasing factors are properly accounted for in the analysis. This would include incorporation of season (or month) and flow into the analysis to adjust comparisons for the biasing effects of these confounding factors. In the statistical literature this is usually referred to as an analysis of covariance.

b. Comparisons between pre- and post-TCRA water column PCB concentrations are inappropriate because samples prior to TCRA are heavily influenced by elevated PCB concentrations measured at flows exceeding 3000 cubic feet per second (cfs), whereas no samples were collected at these higher flows during post-TCRA conditions. Differences in mean concentration should either be computed using only data with similar flow ranges (i.e. 1000 to 3000 cfs) or the confounding effects of flow should be adjusted out of the comparison.

c. As the analysis stands, the estimated reduction in PCB concentration appears to be overstated.

12) Temporal Trends in Sediment PCB Concentrations

a. The analysis identifies an approximately 19 year half time for sediment PCB concentrations based on analysis of 21 sampling locations. Because half time estimates are sensitive to unbalanced sampling across the PCB distribution a discussion of the method of selection of these 21 locations should be included in the report. How many locations were originally sampled in 1993? Of those how were the 21 locations identified for re-sampling? Do these locations represent a balanced cross section of the PCB distribution, or are they preferentially weighted to either high or low concentration samples?

b. The answeres to these questions are important because it represents a change in CSM in Area 2 relative to Area 1 where sediment concentrations were apparently not declining.

13) Temporal Trends in Fish.

a. In Area 1, fish tissue PCB half times were found to be sensitive to covariation between PCB and lipid content. Area 2 and all subsequent tissue analyses should include natural log of lipid in the regression functions. Length has also been found to be important for some species at some locations. Analyses should also include length as a covariate when estimating temporal decay rates.

b. Declining temporal trends appear to be slowing with time. An analysis of fish tissue data should also consider more restricted periods of time to assess the extent to which the rates of decay may be changing. Resolution of these issues with regard to the Area 1 FS should be reflected in the Area 2 RI and FS.

c. After adjusting for covariation with lipid, half times for smallmouth bass and carp are estimated to be on the order of 14 years with upper confidence limits on the order of 30 or more years for both species.

d. The RI states that temporal decay explains more variation than length or lipid, although no analysis is presented to back up this statement. MDEQ has found that in most species and at most locations lipid is much more important in explaining variation in fish tissue PCB levels than either time or fish length.

e. The effect of the TCRA on PCB fish tissue concentrations should be evaluated.

Specific Comments

1. Page ES-2, Key Findings, First Bullet: Although PCB levels are lower in Area 2 than other areas (e.g., Area 1), they still are present in sediments at concentrations that pose unacceptable risk to human health and sensitive ecological receptors. As stated in the last bullet on Page ES-9, risks associated with the consumption of fish "still exceed acceptable levels set by the USEPA for many of the exposure scenarios." In addition, data suggests that upstream sources of contamination still have the potential to contaminate braided channels within Area 2 and serve as a repository for contaminated material that may subsequently be released into the aquatic environment.

2. Page ES-3, Sediments, First Bullet: As stated above, although PCB levels are lower in Area 2 than other areas, they still are present in sediments at concentrations that pose unacceptable risk to human health as PCBs become more bioavailable. While 99% of samples from Area 2 may be less than 50ppm, approximately 5% of the core locations (14/292) are greater than 50ppm, equating to roughly 4 acres (5%*82acres).

3. Page ES-3, Sediments, Second Bullet - Although PCB levels are lower in the upper end of the main channel of the Kalamazoo River, elevated levels of PCBs are present in sediments and floodplain soils in the upper and southern braided areas. Many of the higher concentrations in sediments are large and continuous [e.g., Gun River (Subarea F), Gun River Lake (Subarea G), Subarea E, Braids in Subarea D, etc.] as documented with both analytical and reconnaissance/probing activities. The last sentence should be deleted.

4. Page ES-4, Sediments, First bullet – text states that areas of the highest concentrations (subareas D and E) are cutoff from flow to the main channel, which isn't the case. The braid in Subarea D along the west side of Subarea E flows at all times and runs back into the main channel near upstream end of Subarea A. The high sediment concentrations on the north side of Subarea E flow, albeit slow, toward the west and the braids are not cut off from the main channel. The end of the bullet states there are a limited number of locations with high PCBs and potential to be remobilized. Since these sediment areas are in braids that flow into the main channel, and based on previous bullets of the ES (i.e., 3rd bullet of ES-3) that state braids in Area 2 continue to be reworked, it appears that this is a contradiction. The report should state that the area is still changing and new channels will form as old ones fill in.

5. Page ES-4, Soils, first bullet – similar to sediments, there are ~5% of the locations that exceed 50 ppm.

6. Page ES-4, Soils, second bullet – there should also be a concluding statement regarding geomorphic and vegetation boundaries as they relate to PCB distribution in soils.

7. Page ES-8, Conclusions, first bullet – the bullet needs to be revised. While surface concentrations may be low, subsurface concentrations are high and because these PCBs at depth will become exposed over time, there is still a risk that Area 2 will remain a source of PCBs to downstream areas.

Section 1:

8. Section 1, Page 1-2, fourth paragraph, fourth sentence – text implies that draw down of Plainwell Dam in 1970s and again in 1987 caused transport of PCBs to braided channels and main channel of Area 2. While this occurred, the biggest contributions of PCBs came to this area during the active discharge of PCB wastes prior to 1970. New islands that formed more recently or on top of PCB deposits (pre-dam removal) reveal lower PCB concentrations.

9. Section 1.1, Page 1-3: This section provides a description of the configuration of the river channel downstream of Plainwell dam. Given that PCBs were detected in surface soils and sediments in the 1 – 5 ppm range and concentrations greater than 50 ppm in subsurface soils and sediments, more detail regarding historical and current flow characteristics of this reach should be provided here or elsewhere in the Area 2 SRI.

Section 2:

10. Section 2.2.2, page 2-6, first paragraph – The SRI states OSI sediment type and sediment thickness data are not used in any SRI activity; however, this information should be provided in an Appendix to help assess the nature and extent of soft sediment (assuming data are usable).

11. Section 2.3.2, page 2-8, first paragraph – MDEQ performed a bathymetric survey within Area 2 in June 2012. These data are available for use.

12. Section 2.4.3, page 2-11, first paragraph – text states that CDM sent Arcadis MDCH fish results for two walleye samples in 1993. Please confirm these data were in the CDM database sent in August 2012 and not from MDCH's online database (or some other source). Review of MDEQ August 2012 database does not appear to have any State of Michigan fish before 1999 (when the LTM program was established).

13. Section 2.5.3, Page 2-18, first paragraph, fifth sentence – revise sentence to say "One-liter samples were collected at each location by raising and lowering the sample bottles to obtain a depth integrated surface water sample."

14. Section 2.5.3, Page 2-19, first paragraph – the text should clarify that the current configuration of samples at the Plainwell outlet is: left bank collected ~5-10 feet off the west side of the former powerhouse channel, mid-channel collected ~5-10 feet off the east side of the former powerhouse channel, and right bank is collected ~5-10 feet off the east side of the river at a location approximately 250 feet upstream of the dam structure within the flow of the main channel (not in the backwater area of the dam structure).

15. Section 2.8, Page 2-22

    a. This entire section should be deleted since work in Area 1 is not applicable to data collection in Area 2. Portions of this section may be better suited in Section 1 (Introduction) or Section 9 (Conceptual Site Model).

    b. If the section is not deleted the following comment applies:

        i. The Areas 2 SRI states: "the most-often sampled fish at the Site tend to live a long time, and therefore data from the older, larger fish would not represent more recent declines in bioavailable PCBs." This section of the report should also note that yearling smallmouth bass were collected in 2006, 2007 and 2008 to monitor the results of the Plainwell time critical removal action. Additionally, it has been documented from LTM data collected at the former Bryant Mill Pond that using adult fish data can show immediate and current decline in bioavailable PCBs.

Section 3:

16. Section 3.1, Page 3-2, First Bullet: The pool elevation of the braided channel appears to be in error. Based on information presented in Figure 1-2, the braided channel in the upper end of Area 2 is a 699 feet NGVD 29 not 696 NGVD 29 as stated. As stated in the second bullet, 696 NGVD 29 is the extent of the current impoundment behind Otsego City Dam.

17. Section 3.3.2, Page 3-5, second paragraph – additional discussion should be included in this section that describes the limitations of data recorded during sediment reconnaissance activities and identification of deposits. This may include statements that the effort was not intended to locate all sediment depositional areas just those readily identifiable; channels were walked and/or motored (depending on water depths) so not all portions of a channel were investigated. Review of all available information reveals more sediment deposits than what is included. See comments to Figures 3-3 and 4-13.

18. Section 3.4, page 3-8. Figure 3-4 – locations OCI SED-117 through OCI SED-126 are not presented on the figure.

Section 4:

19. Section 4.1, Page 4-1: While it is true that the Otsego City area is outside the boundaries of Area 2, the close proximity of a population area to the site may increase the potential of exposure to contaminated areas through recreational activities such as boating and fishing. For example, public access is provided via a canoe launch is located near the Otsego City Dam.

20. Section 4.3.1, Page 4-4: Please confirm the snowfall reference for the City of Otsego. It seems unlikely that the City of Otsego received twice the snowfall as Allegan County (160 inches vs. 85 inches).

21. Section 4.3.2, Page 4-5: The discussion of the 2008 high flow event should use site data to determine whether this event was predominantly an erosive event, a depositional event, or perhaps more likely, an erosive event followed by a depositional event. This information will be useful in evaluating the contaminant transport processes within Area 2.

22. Section 4.4.2, Page 4-9 – In addition to the water and probe depth, sediment core data should also be used. The cores should be used to identify sediments of interest using color, grain size, etc.

23. Section 4.5, Page 4-10 - The results of the hydrodynamic model were used to predict depth averaged velocities and bottom shear forces over a range of flow conditions. While the predictions appear to be consistent with the conceptual site model, they do not account for channel migration which has the potential to mobilize and transport PCB contaminated subsurface sediments and floodplain soils to downstream areas.

24. Section 4.5, page 4-11. The figure numbers referenced in the last sentence of the second paragraph should be 4-9a through 4-9c.

25. Section 4.5, Page 4-11: The text should state that fine grained sediments may be deposited not only during low flow conditions as stated but also during the falling limb of the hydrograph as cohesive sediments suspended during high flow events begin to settle out as surface water velocities decline. It should also be noted that Figure 4-9f, which depicts predicted depth averaged velocities during a 6800 cfs flow event, shows a large swath of low velocities (0 – 0.25 ft/sec) over most of the upper braided area. This information is consistent with the sediment thickness estimates presented in Table 4-4 and Figure 4-10. Finally, it should be noted that the percentage of fine grained materials in the Otsego City dam influenced reach presented in Figure 4-11 is similar to the upstream braids downstream reach. These multiple lines of evidence suggest that moderate to high flow events have the potential to transport PCB contamination from Area 1 sediments, riverbanks and floodplain soils downstream where they may accumulate in the braided channels in the upper end of Area 2.

26. Section 4.5, page 4-12, first paragraph, last sentence – text states that subarea B is stagnant (not flowing) at high flows, which is not true. Surface water has been observed at baseflow flowing from the main channel into subarea B and to the west. The text should be modified accordingly.

27. Section 4.8, page 4-20, first paragraph – there is a recurring theme in the SRI, that lowering of the dam in 1982 and 1991 allowed the river to "carve a new channel in lacustrine sediment bed". This statement does not appear to be supported. The main and braided channels appear to be mostly established by the early 1980s and do not appear to move significantly into areas that would be characterized as lacustrine sediment bed (as compared to the former impoundments at Plainwell, Otsego, and Trowbridge).

Section 5:

28. Section 5.1, page 5-1, first paragraph - References should not be made to a document that was not approved or the reference should state that the document was not approved by MDEQ or EPA (e.g., BBL 2000a and BBL 2000b on page 10-3).

29. Section 5.1.1, page 5-3, Calculation of Total PCB – text states that total PCB was only calculated if all seven Aroclors were analyzed. The report should identify when less than 7 Aroclors were analyzed and therefore (we assume) no total PCB was calculated.

30. Section 5.1.1, page 5-4, 2012 cores – this section needs to be expanded to discuss in detail how floodplain samples were collected, what are the differences in each method, and how to

properly characterize nature and extent of PCBs in soil in those areas where Macro-Cores were used. See general comment 3.

31. Section 5.2, page 5-5, first paragraph, last sentence – delete sentence.

32. Section 5.2.1, Figures 5.1-1a and 5.1-1b: The figures that present PCB concentrations (e.g., Figures 5.1-1a and 5.1-1b) should depict additional PCB concentration intervals below 1 ppm (e.g., 0.25 ppm and 0.5 ppm). According to Table 5.2-3, only 15.2% of the surface sediment samples and 17.3% of the subsurface samples exceed 1 ppm. However, this is the lowest PCB concentration presented in Figures 5.1-1a and 5.1-1b. As a result, Figures 5.1-1a and 5.1-1b misrepresent the distribution of PCB sediment contamination within Area 2.

33. Section 5.2.2, Page 5-7: In most areas of the site, median surface sediment PCB concentrations exceed median subsurface sediment PCB concentrations (See Figure 5.2-4). This data suggests that Area 1 remains a source of PCB contamination to Area 2. In addition, while a statistical comparison was performed between areas (Table 5.2-4), it would be useful to perform a statistical comparison between surface and subsurface samples for each of the areas.

34. Section 5.2.2, page 5-8, third full paragraph and Table 5.2-3. Although 25 samples from five cores were collected from Area F (a relatively low sample size), 25% of subsurface sediment samples were greater than 10 ppm and 10% of subsurface sediment samples were greater than 50 ppm (the maximum subsurface percentages of any Area). Based on the available data, Area F should be recognized as one of the Areas with the highest PCB concentrations in subsurface sediment along with Areas D and E. Area F subsurface also has relatively high TOC and relatively low percent solids along with 65% fine-grained sediments as further lines of evidence.

35. Section 5.2.3, page 5-9, second paragraph – include more detailed discussion on size of the areas greater than 50 ppm.

36. Section 5.2.5, Table 5.2-11: The analysis of co-located samples presented in Section 5 should attempt to identify areas where sediment concentrations are declining and areas where sediment concentrations are generally stable or increasing. Although the trends presented in Table 5.2-11 look promising, there is significant variability in individual results. For example, while station KPT-73-1 shows a decline from 3.1 to 0.51 to 0.048 ppm, Station KPT-72-4 shows concentrations staying the same or increasing from 1.5 to 0.11 ppm to 2.6 ppm.

    Additionally, it was recognized in the field during Area 2 SRI sampling in 2011 that planned versus actual sample coordinates were off by approximately 25 feet. This distance was due in part to differences in the units of the projected coordinates between the office and the field survey equipment. As a result, many "co-located" samples are at least 25 feet apart (e.g., KP12C-8, OCISED-085, KPT79-7). As a result, use of the data for sediment trends is inappropriate.

37. Section 5.2.6, Table 5.2-12: Table 5.2-12 presents SWACs for each of the areas within Area 2 as well as all of Area 2. SWACs range between 0.027 (Gun River) to 2.9 (Cut-Off Braids). It should be noted that for Area 1, a remedial action level of 1 ppm total PCBs results in an estimated SWAC of 0.15 ppm and that a SWAC of 0.15 ppm may be necessary to reduce PCB fish tissue concentrations. Areas with SWACs greater than 0.15 ppm include: Lower Braids, Upper Braids, Cut-off Braids, and Pond Area.

38. Section 5.2.6, Figure 5.2-15: This figure presents the mass of PCBs present in various areas and depth intervals within Area 2. It should be noted that the area and depth interval containing greatest mass of PCBs is within Upper Braids between 12 and 24 inches in depth. In addition, as noted in the comments on Appendix C below, the approach used to estimate the mass of PCBs within Area 2 fails to properly account for non-detected sediment results and as a result, underestimates the mass of PCBs present in Area 2 sediments. Section 5.2.6, page 5-14, Table 5.2-12. Surface sediment data only were used in the calculation of the SWAC, however, it is the subsurface that contains the greatest percentage of the PCBs. For example, in Area F, the top 0-2" as presented in Table 5.2-12 is low based on one detect in five samples, but samples from 2"-6" have 12/20 detects, including two results greater than 50 ppm. Subsurface sediment concentrations in key Areas D and E are also substantially higher. Using data within the top 6" would result in a very different area wide SWAC and perhaps more representative of PCBs that are available for mixing and contact.

39. Section 5.2.7, page 5-15, Table 5.2-14. Areas F and G should not be dismissed as they contain a large percentage of PCB and yet represent a small area percentage within Area 2. Grouped together, Areas F and G represent 20% of the PCB mass and yet only 7% of the total sediment surface area and 12% of PCB containing volume. Combined with the Upper and Cut-off braids, that results in 74% of PCB mass, and yet only 43% of PCB sediment containing volume and 32% of sediment surface area (26 acres).

40. Section 5.3.2, page5-21, first paragraph. It is stated that the subsurface samples had a greater proportion of PCB concentrations below 1.0 ppm (82.4%) compared to surface samples (63.4%) and yet the subsurface had a higher incidence of samples greater than 50 ppm in 1.2% of samples (18 of 1,462). This would seem to indicate that the subsurface is more likely to have hot spots of PCBs, with distinctly "clean" and contaminated areas of PCB sediment.

41. Page 5-25, 2nd full paragraph. The words "sediment" should be soil in this paragraph.

42. Page 5-28, third full paragraph. Subsurface R value should be 0.66 rather than 0.61 based on Table 5.3-11.

43. Section 5.3.5, page 5-28 – Summarize SWACs by geomorphic designation and vegetative type.

44. Section 5.3.6, Page 5-29. Please provide a summary table for soil similar to Table 5.2-14 for sediment.

45. Section 5.4, Page 5-35: The evaluation of surface water data within Area 2 would benefit from presentation of seasonal changes in flow condition. For, example, a table or figure that presents average flow on a monthly basis. In addition, the analysis should consider load in addition to concentration. During low flow conditions, localized sources of PCB contamination may show up as spikes in surface water levels. However, during high flow conditions, localized sources may be diluted as a result of high flows. However, during high flows, the total load of PCBs within the system may be higher despite the detection of relatively low concentrations of PCBs in surface water. Understanding the relationship between concentration, flow and load is fundamental to the development of an accurate conceptual site model for contaminant transport within the system.

46. Section 5.4.1, Page 5-35, third full paragraph. This paragraph should reference Table 5.4-4 for Farmer Street Bridge surface water data. A table should be provided for average monthly PCB concentrations for Plainwell dam.

47. Section 5.5.2, Page 5-39, first paragraph. With regard to sources of variability in fish tissue PCB concentrations, it is stated that analytical factors include "differences among laboratories". Besides data quality, please explain what differences among laboratories lead to fish data variability.

48. Section 5.5.3, Page 5-41, second paragraph. It is stated that "differences in lipid content tend to highlight the differences between types of analyzed samples". Please clarify what is meant by "types of analyzed samples".

Section 6:

49. Section 6.3, Table 6-4: Table 6.4 appears to present annual average PCB load. As stated in the comment on Section 5.4 above, loading estimates should be developed for a range of flow conditions based on Kalamazoo River flow data and flow specific surface water results.

50. Section 6.3.1, Tables 6-6 and 6-7: The information presented in Tables 6-6 and 6-7 requires additional explanation concerning the uncertainty of the underlying surface water concentrations. Calculating loads should be avoided without presenting error bars. See range of concentrations in Figure 6-1 to illustrate magnitude in the range of results.

51. Page 6-13, Section 6.5, first paragraph. It is stated that the mean PCB concentration in floodplain soil is low at 1.9 ppm. Subjective designations of high and low should be avoided within the text. Under current conditions, "low" floodplain material can represent a "high" source to the more sensitive aquatic system.

52. Page 6-13, Section 6.5, second and third paragraphs. In the second paragraph, it is stated that the transport of PCBs out of the floodplain is not expected even under inundation conditions. In the next paragraph one of the reasons given that PCBs will continue to decrease over time in the floodplain is the "transfer of dissolved PCBs during periods of inundation". The same process is downplayed indicating that it is not significant when it comes to contributing to further sediment/surface water contamination and yet given as reason that concentrations will decrease in the floodplain over time. Further, transport of PCBs from the floodplain to the river is not the only exposure scenario of concern. Inundation of floodplain soils, especially during fish spawning season, is a high concern because inundation effectively converts inundated floodplains to aquatic environments. In such environments, very low PCB concentrations are required for adequate protection of aquatic life and piscivorous receptors. These environments that are neither aquatic nor terrestrial should be acknowledged in the CSM so that corresponding risks associated with the environments can be evaluated.

Section 7:

53. Section 7.2, Page 7-5. Throughout this Section 7 and Appendix J exposure point concentrations are referred to as "upper bound EPCs". EPCs are not "upper bound". Please delete use of this phrase throughout this section.

54. Section 7.2.3, Page 7-8. This section should specifically identify the risk drivers resulting in immunological effects versus reproductive effects.

Section 9:

55. Section 9.1.1, Page 9-1, first paragraph. The median wet weight PCB concentrations in smallmouth bass are given in this paragraph. Please present the median wet weight for carp as well.

56. Section 9.1.1, Page 9-2: PCB tissue levels within Area 2 are compared to Morrow Lake. However, it should be recognized that Morrow Lake appears to be impacted by localized sources. Ceresco Reservoir and Morrow Lake both need to be presented for background comparisons to Area 2. For example, PCB tissue levels in smallmouth bass and carp within Ceresco Reservoir are 0.04 and 0.2 ppm respectively.

57. Section 9.1.1, Page 9-2, third paragraph. It is not appropriate to conclude that the state fish advisories are more protective than necessary. Such statements should be removed from the SRI Report.

58. Section 9.1.1, Page 9-2, fourth paragraph. This paragraph downplays risk estimates due to current exposure conditions that may limit exposure (i.e., fishing frequency). Not only is it important to assess each segment of the river in a consistent manner, but restrictions that are currently in place may change in the future resulting in greater access to the river. Fishing frequency is more likely to increase as concentrations of contaminants in fish decrease to such levels that fishing advisories are no longer required. The goal should be to reach a level where there is unrestricted future use with regard to fishing.

59. Section 9.1.2, Page 9-4. It is stated that the next highest proportion of PCB mass after the Upper and Cut-off braids is found in the Lower Main Stem of the river where approximately 150 kg of PCBs (18% of total Area 2 sediment PCB mass) resides in approximately 94,000 cubic yards (36% of total sediment volume) of sediment. Alternatively, the next highest mass may be 168 kg of PCBs from combined Gun River/Pond Area that contains 20% of PCB mass in just 32,000 cubic yards (12% of total sediment volume).

60. Section 9.1.3, Page 9-5: The report should reflect that Area 2 contains a large mass of PCBs. The PCBs in this area are subject to redistribution through natural processes resulting in more uptake by receptors. Unacceptable risks to human health and the environment are present and need to be addressed by this document and the FS.

61. Section 9.1.3, page 9-5 – delete 3rd paragraph on page 9-5 and rest of Section 9.1.3 on page 2-6 since it's not applicable to nature and extent of PCBs in Area 2.

62. Section 9.4, Page 9-11, last bullet. This bullet states that Area 2 risks from consuming fish are now comparable to risks from consuming fish from Morrow Lake. Risks in Area 2 are still unacceptable. The use of Morrow Lake as a reference area needs to be considered within the greater context of assessing background conditions (e.g. Ceresco Reservoir).

Tables:

63. Table 2-2, Page 2-10 – MDEQ also collected SPMD samples during caged catfish deployment and these should be referenced.

64. Tables 7-1 and 7-2, Page 7-5. Hazard quotients should not be reported as three significant figures. Values less than 10 should be reported as one significant figure. Values greater than 10 should be reported as two significant figures. Also the order of the angler scenarios in each table should match for the means of comparison.

Figures:

65. Figure 1-3- In order to see inundation and changes in channel morphology, it would be helpful to remove the polygons in the 1938, 1967, 1988, 1999 aerials (or at least remove the fill within the polygons).

66. Figure 2-1 - Does the 2001/2002 USGS transect survey include sediment data (i.e., PCB Data)? If not, consider removing them from this figure and adding to Figure 3-1a to Figure 3-1d series. The title of Figure 2-1 is soil and sediment data, and may be confusing to include locations of just survey information.

67. Figure 3-3- This figure is missing areas MDEQ considers to be sediment deposits as identified during reconnaissance efforts (e.g., downstream of Gun River [subarea F], backwater area north of Gun River outlet [subarea G], near Otsego City Dam along north and south shorelines [subarea A], portions of subarea D, etc) and the extent of some deposits are not accurately depicted. Since the title of the figure is "…sediment deposits" it should show ALL deposits identified, not just the limited areas ARCADIS "identified" during reconnaissance. In consultation with US EPA and MDEQ direction, this map should show sediment deposits identified, using all available information (reconnaissance, sediment transect cores in 2011, probing and/or sampling efforts) to determine "sediment deposits". For example, data used to support Figure 4-7 and Figure 4-10 should be included in the assessment of sediment deposits within Area 2.

68. Figures 4-9a to 4-9i

    a. Global - Consider using consistent units among figures and figure titles. The previous figures for sediment and water depth (Figures 4-7 and 4-8, respectively) are in feet, whereas Figures 4-9a to 4-9c are in meters and Figures 4-9d to 4-9f are in meters per second.

    b. Figure 4-9a – this figure depicts water depth at baseflow; however, there is no water shown in the channels downstream of Plainwell along the eastern extent of the study area. These channels contain water even at baseflow and should be depicted as such.

    c. Figure 4-9d to Figure 4-9i– The upstream boundary conditions do not appear to be accurately reflected in the figures and should be modified.

        i. The area immediately downstream of former Plainwell Dam spillway shows velocity (0-0.25 m/sec range); however, this area is usually stagnant at baseflow (since no water is overtopping the spillway and no flow is coming from the main channel).

        ii. The small channel downstream of former Plainwell Dam spillway and east of the island at River Mile 54.5 to 54.7 are shown with velocities comparable to the main channel (0.25-0.5 and 0.5-0.75 m/sec ranges). At baseflow (at a minimum) there is no flow through this channel.

iii. The small channel(s) that flow west from the main channel along the south side of the island at River Mile 54.2 to 54.4 are shown with velocities mostly in the 0-0.25 m/sec range. Even during baseflow, velocities in the small channel(s) are much higher than depicted.

iv. The main channel at the upstream extent of Area 2 is shown with velocities in the 0-0.25 and 0.25-0.50 m/sec range. In reality, baseflow through the main channel in subarea A, especially at the upstream extent, is much faster.

69. Figure 4-11- This figure includes generic grouping of river locations. This figure may be more useful if the subarea designations developed in Figure 5.2-3 were used for the data groupings or at least listed under each generic group. For example, what channels/subareas make up the "upstream braided channels"?

70. Figure 4-13 - See comment on Figure 3-3. Similar to Figure 3-3, this should be revised based on consultation with US EPA and MDEQ.

71. Figure 5.2-3 – Consider modifying Area 2 sediment subareas based on the following:

a. Based on aerial photos starting in the 1950s, the location of the confluence between the Kalamazoo River and Gun River has remained relatively constant and deposition of PCB contaminated sediment is unlikely upstream of the current confluence. As such, subarea F should not extend to 106th Avenue. The area between 106th Avenue and the confluence should be removed from subarea F or a new subarea for this reach should be created.

b. A portion of subarea D exists immediately downstream of the Plainwell Dam spillway to the south and east of the island near River Mile 54.5 to 54.7. This area was historically subject to high flow regularly, but since all flow is now through the former powerhouse channel, this area has little to no flow (especially during baseflow) and flow only enters this area north of this island. Since the historic and now current energy distribution are different than the rest of subarea D, it might be appropriate to separate this area.

c. A portion of subarea D exists immediately north of the island near River Mile 54.5 to 54.7 and south of the island from River Mile 54.2 to 54.4 exhibits higher flows and more gravelly bottom, making these braids unlike Subarea D to the north and more like Subarea C.

72. Figure 5.2-17 - The figure (based on the title) shows mass per unit area for sediment locations; however, it appears the figure also includes soil data. It's unclear why soil samples are included.

73. Figure 5.3-30 - The figure (based on the title) shows mass per unit area for soil locations; however, it appears the figure also includes sediment data. It's unclear why sediment samples are included.

74. Figure 5.3-31 - Figure is supposedly showing depth to "Detected PCB" however this appears to be inaccurate. One example is the island at River Mile 53.6 to 53.9 where Figure 5.1-1a depicts most surface PCBs to be detected at concentrations less than 1 ppm. Interpretation of Figure 5.3-31 at this island is that PCBs weren't detected until 30 or 40 inches below ground surface.

Either the figure title needs to be changed to reflect what the data is showing, or the correct data be shown.

75. Figures 5.5-1 to 5.5-4- Simple figures for fish trend observations should be restricted to lipid-normalized data.

76. Figure 5.5-5 – each year should be separated when assessing PCB and lipids, since lipids can vary from year to year, confounding a correlation.

77. Figure 6-7 - Lack of critical evaluation of available tissue data makes the updated risk calculations seem disingenuous. Examples are provided:

    a. When examining Figure 6-7, it is clear that data across the time frame from the early 90's to 2011 have shown ups and downs depending on year of collection. Assuming that any one year of fish collection is representative for the current status of the river is simply incorrect. The next round of sampling could show a relative increase in tissue concentrations based on historical observations.

    b. A variety of environmental factors will influence lipid concentrations, growth rates, reproductive capacity, etc. in fish in the river. The SRI conclusion implies that GP assumes that conditions in the river are constant and any fish taken at any time lived in these constant conditions. This implied assumption is clearly wrong and the SRI cannot reasonably ignore the large uncertainties in available tissue data. The SRI must thoroughly discuss limitations in the data and must use lipid normalization when presenting tissue data in terms of trend analyses.

    c. The SRI examines updated risk numbers for Area 2 in some detail, but fails to discuss in a critical manner how these data should be interpreted versus the "reference area" of Morrow Lake. Examining these data in more detail, it appears that one of three interpretations is true. Since fish tissue concentrations at Morrow Lake do not appear to be decreasing (Table on Page 2-1 of Appendix J), it is not clear what the comparison of ABSA 6 fish tissue concentrations actually means.

        i. The simplest explanation is that 2011 data for Morrow Lake, ABSA 6 or both do not adequately reflect variability either with time or across the fish population to allow meaningful comparisons.

        ii. A second explanation could be that processes governing PCB uptake into fish tissue are different in Morrow Lake and ABSA 1 and that Morrow Lake is therefore an inadequate reference for downstream areas, particularly areas like ABSA6 that are far downstream.

        iii. A third possibility is that Morrow Lake represents a long-term basement for what is achievable from natural attenuation. This possibility implies that the first-order kinetic model for trend analyses is incorrect and should be replaced by a flat-line extending more or less indefinitely from 2011.

    d. Finally, the effect of PCBs in surface water is not considered in interpreting 2011 data. Decreases in surface water PCB concentrations have or nearly have reached steady state under current conditions. Any influence of surface water would appear to be negligible.

e. Overall, the 2011 data provide little support for a dramatic alteration in the relationship between sediment concentration and tissue concentrations and thus a dramatic reduction in possible health risks. Over a two year time period, a reduction in tissue concentrations of 50 to over 60 percent is not anticipated, simpler explanations are easy to identify and such explanations are both more in keeping with current understanding of fate and transport of PCBs in the environment and of previously predicted time trends in fish tissue concentrations.

78. Figure 8-4- Note says that individual sample locations not specified, however, three discrete points are shown. Either the text needs to be changed or the discrete points need to be removed since the collection could have occurred over the entire green hatched area.

79. Figure 9-2- The figure appears to be missing floodplain mass for areas downstream of Trowbridge. If estimates of floodplain mass exist, they should be included in the figure. Otherwise, the figure should be noted that mass has not been calculated yet for these areas. Also, floodplain mass for Area 1 seems low (see MDEQ comments on Area 1 SRI).

Appendix C:

80. The estimates of PCB mass presented in appendix C assume that sediments that were below detection limits for PCBs do not contain PCBs. This assumption is in error. The estimate should develop estimates of sediment concentrations below detection limits using standard procedures such as assuming the non-detected concentrations are present at ½ the detection limit or using more sophisticated approaches such as the use of regression on order statistics (ROS) to extrapolate non-detected results as presented in USEPA's ProUCL guidance.

81. Appendix C calculations for mass and volume appear to differ from previous calculations used in Area 1. A comparison of this method to previously used methods needs to be conducted. The appropriateness of the use of "area fraction" requires more explanation.

82. Section 2, page 3, bullets – the 2012 dataset should be included in the analysis or a rationale for excluding this dataset should be provided.

Appendix E:

83. Section 1, Page 1-1, paragraph 2 – Please include a reference that documents 1957 as the year in which PCBs were first used and disposed of within the Kalamazoo River watershed.

84. Section 1, Page 1-1, paragraph 3, last sentence – the last sentence should be deleted or a reference should be included to support the statement. The sentence implies a connection between PCBs discharged directly and indirectly to the river from paper making processes to use of Aroclor 1242 in capacitors at facilities within the watershed. This is not appropriate unless documentation is referenced indicating use of Aroclor 1242 along with disposal to the river.

Appendix I:

85. The Area 2 SRI should include a series of figures that depict areas of erosion and deposition throughout Area 2. While the cross-sections presented in Appendix I are useful, presenting areas of erosion and deposition on a map of the site would aid in the interpretation of sediment transport processes at the site.

86. Page 1-1, Section 1, bullet 2 – an objective of the erosion pin study was to estimate rates of erosion across various bank types. Somewhere in the SRI main document or Appendix I, there should be a map or table that breaks out bank types for Area 2 by reach or by erosion pin location in order to understand which bank types are eroding.

87. Page 2-1, Section 2, paragraph 1, fourth sentence – the text states transect locations were chosen to represent a variety of bank types and erosion potentials; however there is no mention of what each erosion pin location represents. Similar to the above comment (Page 1-1, Section 1, bullet 2), the bank characteristics should be included.

88. Page 2-1, Section 2 – it's unclear from the description of surveying activities how the 2011 and 2012 elevations were recorded. For example, were the erosion pins surveyed along with the ground elevation or was a distance measured from the ground surface to the erosion pin and the elevation from 2010 used? If the latter and the erosion pin wasn't surveyed, how do we know that the erosion or deposition observed in not from the erosion pin heaving or settling?

89. Page 3-3, Section 3.2, paragraph 1 – it is noted that comparing the results of the example calculation in Table I-4 (i.e., using average vertical change times distance between points) to calculating the actual area between the curves is within 5-10%. This may be another point to add to the uncertainty section.

90. Page 3-4, Section 3.2

    a. A limitation of the dataset that should be recognized in the text is the coarse nature in which the banks were surveyed (i.e., spacing of erosion pins). More measurements are needed on the vertical face of a bank in order to fully evaluate the bank loss. Based on a review of the bank cross sections, there doesn't appear to be any banks that are 'undercut', which could be true; however, it could also be due to no measurements being taken horizontally into the bank.

    b. The last portion of the section acknowledges uncertainty in the data and states that results should be used on a relative basis and should be interpreted with caution on an absolute basis. However, the first bullet of the executive summary on page ES-7 makes statements about PCB loading from bank loss and other concluding statements without mention of these cautionary statements from the Appendix. The executive summary should either be qualified as done in Appendix I or the bullet should be removed.

        i. This also applies to the last bullet on page ES-8 where the text states that river banks are not eroding like Area 3/4. Without supporting data from Areas 3/4 to validate this conclusion, it's difficult to evaluate. Review of Appendix I, Table I-5, Area 2 has 89% (33 of 37 locations) of the banks showing some bank loss. This contradicts statements in the report that indicate banks are not eroding.

        ii. This also applies to the first bullet on page ES-9, where there are bank/erosion statements, specifically, where a majority of river banks are showing minimal changes over time; however, the data used to make this statement (presumably from Appendix I) only cover a period a little over 1 year (i.e., Nov/Dec 2010 to Jan 2012) and statements about trends over a very small time period should be qualified.

91. Figures

a. There are several figures were no water elevation line was depicted but presumably it was measured in the field. For example, plots for OCEP–03–AX/Z show a water surface elevation, but OCEP–03–AY doesn't. This discrepancy should be resolved.

92. Tables

a. Page 3-4, bullet 1 – the bullet acknowledges that banks were not always well defined and the determination of boundaries was subjective. As such, Tables I-1 and I-3 should highlight (or new table[s] created) for each erosion pin location which data were used for the bank erosion calculations (similar to the example calculation provided in Table I-4).

93. Page 3-6, Section 3.2.2 – Objectives 2 and 3 of the erosion pin study (on page 1-1) were to estimate the rate of bank erosion, and estimate the mass and volume of solids/PCBs contribution from the banks to the river. The protocol used for estimating these quantities includes a 'net' component of both the erosion loss and deposition gain. It may be inappropriate to include the depositional gain since the objective is to calculate bank loss to the river. The protocol should be modified whereby if a bank shows deposition, the gain component should be set to zero when calculating bank loss.

a. For example, on page 3-6 for PCB estimation no 1, the average of the total net gain for calculation of PCB loading was used (0.49 ft^2). If the total gain component is not used to estimate bank loss, the average of the total net gain would be -0.88 ft^2 equating to 2,607 yards, or approximately 3.4 kg/yr (versus 1.9 kg/yr using the total net change).

94. Page 3-6, Section 3.2.2

a. Method 1 - The approach is only using the top six inches of PCB/Solids for calculation of bank loading to the river since "most of the average losses were within the top 6 inches". The appropriate supporting evaluation needs to be provided to validate this statement. All loading methods (1-3) should use PCB/Solid data from erodible material (i.e., top of bank to toe of slope) not just the top six inches.

b. Methods 2 and 3

i. It's unclear what depths were used for calculating transect-specific PCB/Solids data. Depths should be of erodible material, not just the top six inches.

ii. Method 2 does not appear to provide useful information as compared to Methods 1 and 3.

iii. More detail should be provided to support loading result of 1.8 kg/yr. This could be included on Table I-5 to show transect specific PCB and Solids data used along with stream length.

c. Method 4 (New) -A hybrid of Method 3 should be considered where the 21,000 ft of river bank without specific PCB/Solids data are grouped and estimated based on bank types (versus using an arbitrary reach average).

Appendix J:

95. The updated risk calculations make reference to Morrow Lake as the reference location. As noted in previous comments on the Area 1 SRI, Ceresco Reservoir an important part of the discussion of reference conditions and is less likely to be impacted by local sources of contamination. Mean PCB concentrations in smallmouth bass and carp collected from Ceresco Reservoir are 0.04 and 0.2 ppm respectively. These values are significantly lower than the Morrow Lake values presented in Appendix J.

96. The updated risk calculations do not address data representativeness. This rather extraordinary omission renders the calculations' results meaningless. Risk assessments must be based on data that can be shown to be representative and the uncertainties in such data must be discussed. Comments below highlight some of the failures of the SRI report and Appendix J in this regard.

97. Discussions of health risks and to comparisons with Morrow Lake must be rewritten with attention to:

    a. Uncertainties in fish tissue data base over time, particularly as they reflect data representativeness.

    b. Effects of differing environmental conditions that may affect PCB uptake into tissues as measured by lipid content.

    c. Sample size.

    d. Use of Morrow Lake and Ceresco Reservoir as reference areas in the greater context of site background.

    e. Implications for what tissue levels can reasonably be achieved within Area 2.

98. Although lipid is not used in the EPC estimates of the HHRA Exposure Assessment reported in Appendix J, PCB is strongly correlated to lipid content. The human health exposure discussion should include an evaluation of recent patterns in lipid content.

Appendix K:

99. Avian TRVs focus on dioxin-like effects, and non-dioxin like effects are ignored even though EPA and others consider these other effects to be very important.

100. Assuming dioxin like effect is a basis for "avian sensitivity", there is a focus on chicken toxicity data, and chickens are assumed to be uniquely sensitive. Assumption is not supported by available data suggesting several other taxa may be equally sensitive to PCBs (again, based on dioxin-like effects only).

101. Avian sensitivity ratings (Low, Mod, High) are based on AHR induction, and are not necessarily linked to ecologically significant adverse effects such as survival, growth, and reproduction. These categories appear to be based more on genetic similarity than on sensitivity to the combined (dioxin-like and non-dioxin like) effects of PCB exposure.

102. Potentially useful data from studies generated by MSU are ignored or not considered. (e.g., the Blankenship study that showed many reproductive effects in songbirds linked to soil total PCB

concentration of 6.5 ppm (Trowbridge vs. Fort Custer)). The Area 2 SRI should discuss statistical significance vs. biological significance for the individual reproductive parameters.

103. Area 2 SRI states that no changes to aquatic risk estimation as presented by MDEQ/CDM BERA are proposed. If accurate, then sediment total PCBs should remain below 0.5 ppm and other media (e.g., prey) should follow recommendations per 2003 BERA (whole body fish tissue, etc.) to protect ecological consumers of aquatic life.

104. One study referenced in the review of Area 1 SRI suggested that shrews may be as sensitive to PCBs as mink, and therefore using mouse or rat TRVs for shrews may substantially underestimate risk to shrews (shrew-specific toxicity data are lacking).

105. HQs for avian receptors based on Approaches 2 and 3 are elevated, and not consistent with results of Approach 1 for these receptors. These inconsistencies suggest it would be prudent to err on the side of protectiveness, given the stated uncertainties for all approaches. Insufficient support is provided for selecting the results of one approach over those of another.

Appendix M:

106. The model should accurately reflect current conditions at the upstream boundary (e.g., free-flow at former Plainwell Dam). For example, baseline conditions in Figure M-3 (and Figure 4-9d in the report):

    a. Inaccurately portrays free-flow through powerhouse channel. At no point in the upstream end should flow be in the 0-0.25 m/sec range. Flows immediately upstream and downstream of the former Plainwell Dam are fast.

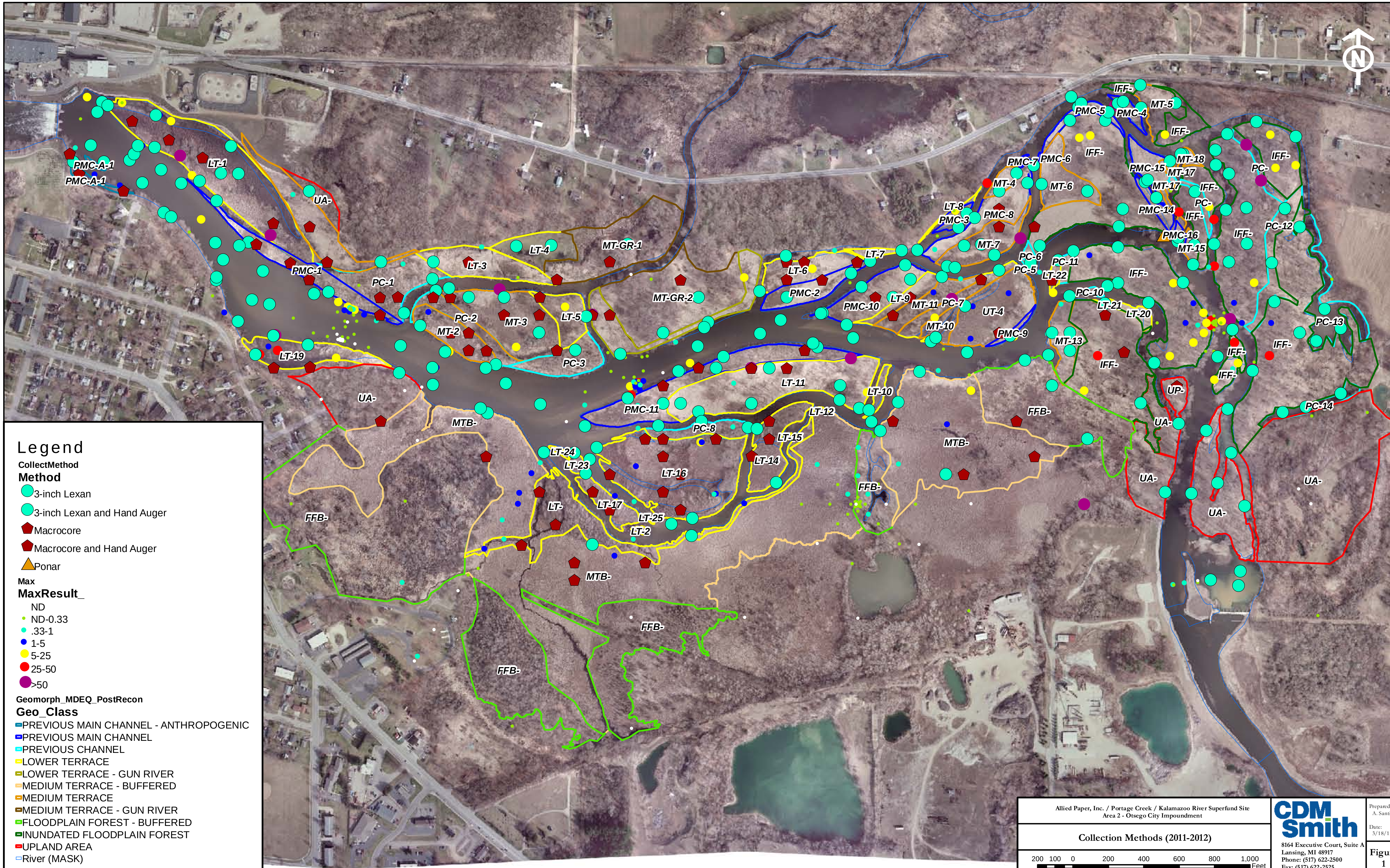
    b. Inaccurately portrays flow (at baseflow) in the area immediately downstream of the Plainwell Dam spillway. During baseflow, this area is stagnant and mostly disconnected from the main stem. The small channel along the east, therefore, should not have flow.

107. Section 8.1, page 8-1 – first paragraph – the maximum localized velocity is stated as 2.5 ft/sec but Figure M-3 shows velocities in 'red' which are on the order of 4 to 5 ft/sec. This discrepancy should be resolved in the text or figure.

References

USEPA 2010. Hudson River PCBs Site Revised Engineering Performance Standards for Phase 2. http://www.epa.gov/hudson/phase2_docs/revised_eps.pdf. Last visited 3/25/2013.

USEPA 2012. Appendix H: Coverage Rates for Selected Upper Confidence Limit Methods for Mean of Total PCB in Sediments: Final Feasibility Study Lower Duwamish Waterway. http://www.epa.gov/region10/pdf/sites/ldw/fs13/final_fs_appH_103112.pdf last visited 3/25/2013.


Legend
CollectMethod
Method
3-inch Lexan
3-inch Lexan and Hand Auger
Macrocore
Macrocore and Hand Auger
Ponar
Max
MaxResult_
ND
ND-0.33
.33-1
1-5
5-25
25-50
>50
Geomorph_MDEQ_PostRecon
Geo_Class
PREVIOUS MAIN CHANNEL - ANTHROPOGENIC
PREVIOUS MAIN CHANNEL
PREVIOUS CHANNEL
LOWER TERRACE
LOWER TERRACE - GUN RIVER
MEDIUM TERRACE - BUFFERED
MEDIUM TERRACE
MEDIUM TERRACE - GUN RIVER
FLOODPLAIN FOREST - BUFFERED
INUNDATED FLOODPLAIN FOREST
UPLAND AREA
River (MASK)
Allied Paper, Inc. / Portage Creek / Kalamazoo River Superfund Site
Area 2 - Otsego City Impoundment
Collection Methods (2011-2012)
200 100 0 200 400 600 800 1,000
Feet
CDM Smith
8164 Executive Court, Suite A
Lansing, MI 48917
Phone: (517) 622-2500
Fax: (517) 622-2525
Prepared By:
A. Santini
Date:
3/18/13
Figure
1

Attachment A

MatrixGrp	MDEQ_GeoLabel	Method	Count		PCB (mg/kg)		Penetration (ft)			Recovery (ft)		
			Cores	Samples	Avg	Max	Avg	Min	Max	Avg	Min	Max
Floodplain Soil	<Null>	3-inch Lexan	4	18	1.3	16.0	3.3	1.0	4.6	2.7	0.9	3.4
Floodplain Soil	<Null>	Macrocore	3	9	4.4	50.0	4.0	4.0	4.0	1.7	1.0	2.3
Floodplain Soil	FFB-	3-inch Lexan	4	17	1.1	5.4	3.0	2.4	4.3	2.5	2.0	3.0
Floodplain Soil	FFB-	Macrocore	2	8	0.9	2.9	3.8	3.5	4.0	2.6	2.0	3.2
Floodplain Soil	IFF-	3-inch Lexan	21	124	3.5	72.0	4.9	3.0	6.3	4.4	2.1	5.9
Floodplain Soil	IFF-	Macrocore	3	13	9.2	34.2	4.0	4.0	4.0	2.5	2.3	2.7
Floodplain Soil	LT-	3-inch Lexan	1	5	0.4	1.6	4.7	4.7	4.7	3.3	3.3	3.3
Floodplain Soil	LT-	Macrocore	3	12	1.4	5.5	4.0	4.0	4.0	1.9	1.4	2.5
Floodplain Soil	LT-1	3-inch Lexan	7	49	11.2	99.0	6.0	4.6	7.0	5.1	4.3	5.8
Floodplain Soil	LT-1	Macrocore	4	18	8.3	43.0	4.0	4.0	4.0	2.9	2.3	3.2
Floodplain Soil	LT-11	3-inch Lexan	7	47	6.4	112.0	4.8	4.0	6.4	4.6	3.8	6.1
Floodplain Soil	LT-11	3-inch Lexan and Hand Auger	1	7	7.5	35.0	5.0	5.0	5.0	5.0	5.0	5.0
Floodplain Soil	LT-11	Macrocore	1	4	14.3	56.7	4.0	4.0	4.0	3.5	3.5	3.5
Floodplain Soil	LT-11	Macrocore and Hand Auger	1	6	4.4	23.9	5.0	5.0	5.0	5.0	5.0	5.0
Floodplain Soil	LT-14	3-inch Lexan	1	7	0.4	1.6	3.9	3.9	3.9	3.8	3.8	3.8
Floodplain Soil	LT-14	Macrocore	3	15	0.3	1.4	4.0	4.0	4.0	2.5	2.1	2.8
Floodplain Soil	LT-16	3-inch Lexan	3	22	0.5	1.8	5.1	4.4	6.2	4.4	3.1	6.2
Floodplain Soil	LT-16	Macrocore	7	30	0.8	7.6	4.0	4.0	4.0	2.3	1.6	3.0
Floodplain Soil	LT-17	Macrocore	2	8	0.8	2.6	4.0	4.0	4.0	1.9	1.5	2.3
Floodplain Soil	LT-19	3-inch Lexan	1	8	11.9	63.0	6.5	6.5	6.5	5.5	5.5	5.5
Floodplain Soil	LT-20	3-inch Lexan	1	7	1.7	10.3	5.6	5.6	5.6	5.5	5.5	5.5
Floodplain Soil	LT-22	3-inch Lexan	1	9	1.2	8.9	8.0	8.0	8.0	6.4	6.4	6.4
Floodplain Soil	LT-22	Macrocore	1	4	0.6	1.3	4.0	4.0	4.0	1.8	1.8	1.8
Floodplain Soil	LT-3	3-inch Lexan	1	6	1.4	5.4	4.8	4.8	4.8	4.8	4.8	4.8
Floodplain Soil	LT-3	Macrocore	1	5	1.5	6.6	4.0	4.0	4.0	2.4	2.4	2.4
Floodplain Soil	LT-5	3-inch Lexan	1	5	4.3	15.6	3.4	3.4	3.4	3.0	3.0	3.0
Floodplain Soil	LT-5	Macrocore	1	5	0.0	0.1	4.0	4.0	4.0	2.3	2.3	2.3
Floodplain Soil	LT-6	3-inch Lexan	2	17	3.4	34.9	6.6	6.3	6.8	5.8	5.7	5.9
Floodplain Soil	LT-6	Macrocore	3	12	0.4	1.3	4.0	4.0	4.0	1.7	1.6	1.8
Floodplain Soil	LT-6	Macrocore and Hand Auger	1	6	0.3	0.4	5.0	5.0	5.0	5.0	5.0	5.0
Floodplain Soil	LT-7	3-inch Lexan	1	8	9.9	55.3	6.1	6.1	6.1	5.8	5.8	5.8
Floodplain Soil	LT-9	3-inch Lexan	1	8	0.4	1.1	7.5	7.5	7.5	7.3	7.3	7.3
Floodplain Soil	LT-9	Macrocore	1	6	0.5	1.5	5.0	5.0	5.0	5.0	5.0	5.0
Floodplain Soil	LT-GR-1	3-inch Lexan	3	22	4.3	60.9	5.7	5.1	6.2	5.5	5.1	5.8
Floodplain Soil	LT-GR-1	Macrocore	2	8	2.1	10.8	4.0	4.0	4.0	2.1	1.9	2.3
Floodplain Soil	MT-11	3-inch Lexan	1	10	3.1	19.6	7.1	7.1	7.1	7.1	7.1	7.1
Floodplain Soil	MT-11	Macrocore and Hand Auger	1	7	0.4	1.8	5.0	5.0	5.0	5.0	5.0	5.0
Floodplain Soil	MT-13	3-inch Lexan	3	12	2.3	17.9	3.4	2.5	3.9	3.2	2.3	3.8
Floodplain Soil	MT-15	3-inch Lexan	2	12	2.5	8.5	4.5	4.3	4.8	4.4	4.3	4.4
Floodplain Soil	MT-17	3-inch Lexan	1	9	0.3	1.0	6.5	6.5	6.5	6.5	6.5	6.5
Floodplain Soil	MT-18	3-inch Lexan	1	9	6.8	42.5	7.1	7.1	7.1	6.9	6.9	6.9
Floodplain Soil	MT-19	3-inch Lexan	1	3	1.8	5.5	1.8	1.8	1.8	1.8	1.8	1.8
Floodplain Soil	MT-19	Macrocore	2	7	1.5	7.3	3.5	3.0	4.0	2.1	1.7	2.5
Floodplain Soil	MT-2	3-inch Lexan	3	19	0.7	6.5	5.3	5.0	6.0	4.8	4.5	5.0

Attachment A

MatrixGrp	MDEQ_GeoLabel	Method	Count		PCB (mg/kg)		Penetration (ft)			Recovery (ft)		
			Cores	Samples	Avg	Max	Avg	Min	Max	Avg	Min	Max
Floodplain Soil	MT-2	Macrocore	4	20	2.8	14.2	4.0	4.0	4.0	2.2	1.6	2.6
Floodplain Soil	MT-3	3-inch Lexan	3	19	1.9	12.2	4.1	3.9	4.3	3.9	3.3	4.3
Floodplain Soil	MT-3	Macrocore	4	18	0.7	4.8	4.0	4.0	4.0	2.2	2.2	2.3
Floodplain Soil	MT-4	3-inch Lexan	1	6	6.8	23.0	3.8	3.8	3.8	3.2	3.2	3.2
Floodplain Soil	MT-5	3-inch Lexan	1	7	1.4	5.8	5.5	5.5	5.5	5.5	5.5	5.5
Floodplain Soil	MT-6	3-inch Lexan	2	11	1.8	5.6	5.0	4.0	6.0	4.3	3.2	5.5
Floodplain Soil	MT-7	3-inch Lexan	4	29	1.2	21.0	5.6	5.0	6.4	5.3	4.4	5.9
Floodplain Soil	MT-7	Macrocore	1	4	0.7	1.5	4.0	4.0	4.0	2.2	2.2	2.2
Floodplain Soil	MTB-	3-inch Lexan	5	21	1.3	4.2	4.4	3.0	6.3	3.8	2.6	4.7
Floodplain Soil	MTB-	Macrocore	5	18	0.3	1.0	4.0	4.0	4.0	2.2	0.8	3.6
Floodplain Soil	MTB-	Macrocore and Hand Auger	1	6	8.8	26.8	4.0	4.0	4.0	3.1	3.1	3.1
Floodplain Soil	MT-GR-1	3-inch Lexan	1	6	0.0	0.1	5.0	5.0	5.0	4.5	4.5	4.5
Floodplain Soil	MT-GR-1	Macrocore	2	8	0.0	0.0	4.0	4.0	4.0	2.3	2.2	2.4
Floodplain Soil	MT-GR-2	3-inch Lexan	1	6	0.1	0.5	5.5	5.5	5.5	5.1	5.1	5.1
Floodplain Soil	MT-GR-2	3-inch Lexan and Hand Auger	1	9	0.7	4.3	5.0	5.0	5.0	5.0	5.0	5.0
Floodplain Soil	MT-GR-2	Macrocore	1	4	0.2	0.6	4.0	4.0	4.0	2.3	2.3	2.3
Floodplain Soil	PC-	3-inch Lexan	1	7	3.9	10.9	5.0	5.0	5.0	4.8	4.8	4.8
Floodplain Soil	PC-1	3-inch Lexan	1	8	0.1	0.3	5.7	5.7	5.7	5.7	5.7	5.7
Floodplain Soil	PC-1	Macrocore	2	9	0.1	0.4	4.0	4.0	4.0	2.5	2.4	2.5
Floodplain Soil	PC-12	3-inch Lexan	2	16	13.5	48.0	4.5	3.9	5.0	4.4	3.9	4.8
Floodplain Soil	PC-2	3-inch Lexan	1	8	0.2	0.8	7.3	7.3	7.3	6.7	6.7	6.7
Floodplain Soil	PC-2	Macrocore	1	4	0.0	0.1	4.0	4.0	4.0	2.4	2.4	2.4
Floodplain Soil	PC-3	3-inch Lexan	1	10	16.5	100.0	6.8	6.8	6.8	6.8	6.8	6.8
Floodplain Soil	PC-7	3-inch Lexan	2	14	22.6	108.0	5.0	4.5	5.6	4.3	3.7	4.8
Floodplain Soil	PC-7	Macrocore	1	4	8.5	32.4	4.0	4.0	4.0	2.0	2.0	2.0
Floodplain Soil	PC-8	3-inch Lexan	3	21	0.3	1.8	4.1	3.6	5.0	4.1	3.6	5.0
Floodplain Soil	PC-8	Macrocore	1	4	0.2	0.5	4.0	4.0	4.0	2.1	2.1	2.1
Floodplain Soil	PMC-1	3-inch Lexan	2	18	1.0	8.0	7.2	6.4	8.0	6.6	5.6	7.7
Floodplain Soil	PMC-1	Macrocore	4	17	0.1	0.5	4.0	4.0	4.0	2.2	1.6	2.8
Floodplain Soil	PMC-10	3-inch Lexan	6	40	0.5	3.3	5.5	4.0	8.5	4.8	3.1	6.9
Floodplain Soil	PMC-10	Macrocore	1	5	0.5	0.8	4.0	4.0	4.0	2.1	2.1	2.1
Floodplain Soil	PMC-11	3-inch Lexan	5	38	4.4	134.0	5.2	4.0	6.0	5.1	4.0	6.0
Floodplain Soil	PMC-11	Macrocore	1	4	0.1	0.2	4.0	4.0	4.0	3.0	3.0	3.0
Floodplain Soil	PMC-11	Macrocore and Hand Auger	2	13	0.2	0.7	5.0	5.0	5.0	5.0	5.0	5.0
Floodplain Soil	PMC-14	3-inch Lexan	1	5	0.4	0.6	3.4	3.4	3.4	2.6	2.6	2.6
Floodplain Soil	PMC-15	3-inch Lexan	1	5	0.3	0.9	3.8	3.8	3.8	3.8	3.8	3.8
Floodplain Soil	PMC-16	3-inch Lexan	1	6	0.6	1.0	4.0	4.0	4.0	3.8	3.8	3.8
Floodplain Soil	PMC-2	3-inch Lexan	2	14	6.7	72.8	5.2	5.0	5.3	4.5	4.5	4.6
Floodplain Soil	PMC-2	Macrocore and Hand Auger	1	5	0.5	1.6	5.0	5.0	5.0	5.0	5.0	5.0
Floodplain Soil	PMC-3	3-inch Lexan	1	7	8.0	52.8	5.4	5.4	5.4	5.4	5.4	5.4
Floodplain Soil	PMC-4	3-inch Lexan	2	17	6.3	43.1	7.7	7.4	8.0	6.5	5.8	7.2
Floodplain Soil	PMC-5	3-inch Lexan	2	14	0.5	1.5	6.5	6.1	7.0	6.5	6.1	6.8
Floodplain Soil	PMC-8	3-inch Lexan	4	29	2.7	45.0	5.8	4.0	6.8	5.5	4.0	6.3
Floodplain Soil	PMC-8	Macrocore	1	5	0.2	0.4	4.0	4.0	4.0	2.3	2.3	2.3

Attachment A

MatrixGrp	MDEQ_GeoLabel	Method	Count		PCB (mg/kg)		Penetration (ft)			Recovery (ft)		
			Cores	Samples	Avg	Max	Avg	Min	Max	Avg	Min	Max
Floodplain Soil	PMC-9	3-inch Lexan	1	8	3.3	17.2	7.5	7.5	7.5	7.0	7.0	7.0
Floodplain Soil	PMC-A-1	3-inch Lexan	1	8	10.4	59.0	5.0	5.0	5.0	5.0	5.0	5.0
Floodplain Soil	PMC-A-1	Macrocore	2	10	16.7	49.0	4.0	4.0	4.0	3.3	2.8	3.8
Floodplain Soil	UA-	3-inch Lexan	7	36	0.7	3.8	3.2	2.5	4.3	2.9	2.3	3.6
Floodplain Soil	UA-	Macrocore	1	4	0.0	0.0	4.0	4.0	4.0	2.3	2.3	2.3
Floodplain Soil	UA-	Macrocore	1	5	2.2	10.3	4.0	4.0	4.0	2.9	2.9	2.9
Floodplain Soil	MT-4	3-inch Lexan	3	3	3.7	5.0	5.7	4.6	6.4	4.4	3.5	5.1
Floodplain Soil	MT-4	Macrocore	1	7	3.0	10.5	4.0	4.0	4.0	3.8	3.8	3.8

FFB	Floodplain Forest Buffered
LTGR	Low Terrace Gun River
IFF	Inundated Floodplain Forest
LT	Low Terrace
MT	Medium Terrace
PC	Previous Chanel
PMC	Previous Main Channel
UA	Upland Area
PMC-A	Previous Main Channel - Anthropogenic